

**Calvin M. Hopper**  
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Calvin M. Hopper retired from the Oak Ridge National Laboratory in 2008 as a Distinguished Development and Design Engineer in the Radiation Transport and Criticality Group within the Nuclear Science and Technology Division. In his continuing nuclear criticality safety consultancies he performed part-time on-going work for ORNL through contracts to US NRC [2008 – 2013] and the US DOE [1997 – present], three years of consulting to the Oak Ridge Y-12 National Security Complex [2008 – 2011], two years of consulting to the Defense Nuclear Facility Safety Board [2014 – 2016], and brief consultancies to other research and industry facilities [2016 – present].

Over the past 54 years, following his receipt of a B.S. in Physics from Southern Colorado State College, Hopper has held various technical, administrative and consulting positions within the Oak Ridge, Tennessee contractor facilities. From 1968 to 1970 he worked at the Oak Ridge Critical Experiments Facility as the sole staff Radiation Protection Officer. Following his interests in nuclear criticality experiments, he was employed in 1970 as a Nuclear Criticality Safety (NCS) Engineer with responsibilities for the Development, Metal Preparation, and Assembly Divisions at the Oak Ridge Y-12 Plant and two personnel rotations to the Oak Ridge Gaseous Diffusion Plant providing NCS support to the developing gas centrifuge enrichment project. He provided NCS consulting services to the US NRC licensed US Nuclear, Inc. research reactor fuel fabrication facility in Oak Ridge, TN. In 1978 he moved to Attleboro, Massachusetts to work at the Texas Instruments, Inc. HFIR Project that fabricated US DOE research reactor fuel elements. He was the Head of the HFIR Project US NRC Licensing, Nuclear Safety (i.e., Criticality Safety and Health Physics), and Nuclear Materials Accountability organizations. In that capacity, he prepared the first general license submittal to the US NRC for the HFIR Project thereby replacing the 13-year old US NRC specific license and strings of amendments. Upon the 1980 completion of the general licensing process, he returned to the Oak Ridge Y-12 Plant as the Technical Manager of the Oak Ridge Y-12 Plant Health Physics Department. In 1981, he became the Oak Ridge Y-12 Plant NCS Department Head, served on the US DOE Albuquerque Weapons Criticality Safety Committee, and identified issues resulting in a DOE Special Access Program (SAP). In 1985, he transferred to the Oak Ridge National Laboratory (ORNL) to become the first ORNL Criticality Safety Officer and assisted Joseph T. Thomas in the development and management of the US DOE sponsored Nuclear Criticality Technology and Safety Program (NCT&SP) that was dissolved in 1990. In 1990, Hopper assisted ORNL in developing a NCS Section and in 1994 served as the ORNL NCS Section Head. In 1995, he transitioned to full time within the ORNL Nuclear Science and Engineering Directorate providing services and technical support to ORNL, US NRC, and US DOE projects. In 1997 he assisted the US DOE in the development and establishment of the US DOE Nuclear Criticality Safety Program including its Criticality Safety Support Group (CSSG) for which he is a Charter Member, past Deputy Chair and Chair. He has addressed numerous CSSG Taskings during his 14-year CSSG membership. He transitioned to the CSSG Emeritus Member status in 2013. He co-authored a report that subsequently was responsible for altering IAEA standards regarding nuclear material accountability at the natural uranium purification product stage as opposed to the previous accountability stage for purified  $\text{UO}_2$  – a significant alteration for international nuclear materials safeguards. Upon retirement from ORNL in 2008 he has provided technical and administrative NCS consulting services to ORNL, the Oak Ridge Uranium Processing Facility, and the Oak Ridge Y-12 National Security Complex [2008 – 2013]. In his continuing work for ORNL he planned the development of the US DOE Hands-On Subcritical and Critical Training and Education Project for which he was the Project Coordinator [2010 – 2013]. He participated as the NCS Expert Lead for the 2014 ORNL Uranium Processing Facility “Red Team” review for and recommendations to the Secretary of the US DOE and follow-ons [2015 – 2016].

Throughout his career he has provided both training and NCS analysis consulting services to industries in the US and Canada. Additionally, he has provided educational services through the University of Tennessee – Nuclear Engineering Department graduate classes and Tennessee Industries Week programs and lectured for the US DOE Prevention of Significant Nuclear Events and Potential Safety Impacts of New Technologies on the Operation of DOE Nuclear Facilities. He is currently providing sporadic services to ORNL in the areas of NCS and NCS program assessments with and mentoring support to the US Defense Nuclear Facility Safety Board.

Some of Mr. Hopper's activities and accomplishment include being the Over-all Advisor to ANSI for ISO (International Organization for Standardization) Technical Committee 85 (*Nuclear energy, nuclear technologies, and radiological protection*) / Subcommittee 5 (*Nuclear fuel cycle*) [2000 – 2013]. Also, was the international Convener (Chair) of Working Group 8 (WG 8) on *Nuclear criticality safety* within Subcommittee 5 and Technical Committee 85 for ISO [2000 – 2014] and has continued as a member of WG8. He is a Member of the ANSI/ANS Nuclear Criticality Safety Division (NCSD) [1970 – to date]. In 1974 he co-authored the first publicly released facility nuclear criticality safety computer code validation and authored the seminal Nuclear Criticality Accident Slide Rule while employed at Y-12. He has been the Program Chair, Treasurer, and Co-Chair/Chair of the ANS Nuclear Criticality Safety Division, Chair of ANSI/ANS-8.7 storage standard and Member of ANSI/ANS-8.1, -8.19, -8.23, -8.26 standards working groups. He is a Member and recent past Chair of the ANSI/ANS N16 Consensus Committee (renamed Nuclear Criticality Safety Consensus Committee) on Nuclear Criticality Safety [1998 – 2011]. He was the past manager of the US NRC Criticality Computer Code Sensitivity and Uncertainty Project at ORNL [1995 – 1998] and the past manager of the US DOE NCSP ORNL tasking for the development of sensitivity and uncertainty analysis tools (AROB CAD and TSUNAMI) [1999 – 2008] that have been incorporated into the internationally recognized comprehensive modeling and simulation suite for nuclear safety analysis and design, SCALE. He coauthored the Updated Nuclear Criticality Accident Slide Rule [1998] that is internationally recognized as a useful emergency training and response tool. He was the General Chair of the ANS NCSD 2005 Topical Meeting. He has provided several consultancies to the International Atomic Energy Agency Nuclear Safety and Security in the topical areas of emergency management and nuclear safety guides.

Some of Mr. Hopper's professional recognitions include the advancement to the position of Fellow Member in the American Nuclear Society [2001], US DOE Under Secretary of ES&H citation for successfully managing the US DOE Plutonium ES&H Vulnerability Assessment for the US DOE Oak Ridge Operations Assessment and Team Report [1994], ANS Standards Service Award [2009], NNSA Certificate of Appreciation for the TRUPACT-II and HalfPACT systems criticality safety analysis [2002], American Nuclear Society Nuclear Criticality Safety Division Distinguished Service Award [2008] and Technical Achievement Award [2013], Outstanding Achievement Award from Colorado State University – Pueblo [2003].